UNITED STATES PATENT AND TRADEMARK OFFICE

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10/748,284	12/29/2003	Alexandre J. Farcy	Intel 2207/17051	8397

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2008*.
2a)☒ This action is **FINAL**.　　　　　2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-24,26-35,37-44,46-51 and 53* is/are pending in the application.
　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-12, 14-24, 26-35, 37-44, 46-51 and 53* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
　　a)☐ All　b)☐ Some * c)☐ None of:
　　　1.☐ Certified copies of the priority documents have been received.
　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.
　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   This action is in response to remarks filled on 3/17/2008. Claims 13, 25, 36, 45

and 52 have been cancelled. Claims 1, 4, 14-16, 26, 37-38, 46 and 53 have been

amended. Claims 1-12, 14-24, 26-35, 37-44, 46-51 and 53 are pending for examination.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1-8, 14-20, 26-31, 37-40, 46-47 and 53 are rejected under 35 U.S.C.

103(a) as being unpatentable over Miller (US Pat. No. 6,950,924) in view of Arnold (US

Pat. No. 6,971,091).

4.   As per claims 1, 16, 26, 38 and 46, Miller teaches the invention substantially as

claimed including a processor comprising:

    a processing core (col. 1, line 21) to execute a trace having one or more lines of

one or more micro-operations (col. 1, lines 22-30, 37-39).

5.   However, Miller does not explicitly teach an optimizer to optimize the trace based on runtime information collected by the processing core during a previous execution of the trace.

6.   Arnold teaches an optimizer to optimize the trace based on runtime information collected by the processing core during a previous execution of the trace (col. 4, lines 28-31, 17-20, 22-25, 13-15).

7.   Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Miller and Arnold so that it will provide an adaptive optimization system that uses multiple optimizations levels to improve the performance compared to only a single level of optimization (Arnold col. 3, lines 64-67).

8.   As per claim claims 2 and 17, Arnold teaches wherein the optimizer is a pipelined optimizer (col. 5, lines 8-9, 12-15).

9.   As per claims 3, 18 and 27, Arnold teaches a trace cache to store a trace from said optimizer (260, fig. 2; col. 6, lines 49-51).

10.   As per claims 4 and 29, Miller teaches an instruction cache to store static code received from a compiler via a memory (32, 22 fig. 1); a mite to translate the static code

into micro-operations (32, 22, 34; col. 1, lines 37-39); and a fill buffer to build a trace

from the micro-operations (20, fig. 2).

11.   As per claim 5, Miller teaches a trace queue to store one or more lines of one or

more traces from the fill buffer and one or more lines from one or more traces from the

trace cache (col. 1, lines 44-47, 50-51, 57-59).

12.   As per claims 6, 19 and 28, Miller teaches an allocator to send traces from

the trace queue to the processing core (col. 2, lines 1-4; col. 1, lines 20-25, 44-47, 50-

51, 57-59); but fails to teach that allocator sends traces to the optimizer.

13.   Arnold teaches that allocator sends traces to the optimizer (col. 7, lines 21-25).

14.   As per claims 7, 30 and 39, Miller teaches the processing core is an out of order

processing core (col. 1, lines 20-30).

15.   As per claims 8, 20, 31, 40 and 47, Arnold teaches the optimizer is to track

optimizations executed on a specific trace (col. 8, lines 3-9).

16.   As per claims 14, 37 and 53, Arnold teaches wherein the runtime information is

appended to the trace in the trace cache (col. 8, lines 3-9).

17. As per claim 15, Arnold teaches runtime information buffer to store the runtime information, the runtime information buffer mapped to the trace cache to match the runtime information with the trace (col. 7, lines 53-56).

18. Claims 9-11, 21-23, 32-34, 41-43, and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US Pat. No. 6,950,924) in view of Arnold (US Pat. No. 6,971,091) further in view of Megiddo (US Pat. No. 6,742,179).

19. As per claim 9, Miller and Arnold do not explicitly teach the optimizer is to pack the trace after optimization.

20. Megiddo teaches that the optimizer is to pack the trace (col. 2, lines 21-23).

21. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include packing functionality as taught by Megiddo in Miller and Arnold's system so that it will improve cache utilization and fewer cache misses (Megiddo col. 2, lines 21-23).

22. As per claim 10, Megiddo teaches the optimizer is to pack the trace by optimizing two consecutive lines of a trace simultaneously (col. 2, lines 21-24).

23.   As per claim 11, Megiddo teaches the optimizer is to use an alternating offset to determine the two consecutive lines of the trace to optimize together (col. 5, lines 5-30).

24.   As per claims 21-23, 32-34, 41-43 and 48-50, they are similar claims to claims 9-11, therefore; they are rejected for the same reason as per claims 9-11 above.

25.   Claims 12, 24, 35, 44, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US Pat. No. 6,950,924) in view of Arnold (US Pat. No. 6,971,091) further in view of Benitez (US Pat. No. 6,189,141).

26.   As per claims 12, 24, 35, 44 and 51 Miller and Arnold do not teach wherein optimizations includes at least one of a group of optimizations consisting of call return elimination, dead code elimination, dynamic uop fusion, binding, load balancing, move elimination, common sub- expression elimination, constant propagation, redundant load elimination, store forwarding, memory renaming, trace specialization, value specialization, reassociation, and branch promotion.

27.   Benitez teaches wherein optimizations includes at least one of a group of optimizations consisting of call return elimination, dead code elimination, dynamic uop fusion, binding, load balancing, move elimination, common sub- expression elimination, constant propagation, redundant load elimination, store forwarding, memory renaming,

trace specialization, value specialization, reassociation, and branch promotion (col. 32

see optimizer 920).

28.   Therefore it would have been obvious to one of ordinary skill in the art at the time

of the invention was made to combine the teachings of Miller, Arnold and Benitez so

that it will widen the scope of the invention by adding other types of optimizations

schemes.

Response to Arguments

29.   Applicant's arguments with respect to claims 1-12, 14-24, 26-35, 37-44, 46-51

and 53 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

30.   Applicant's amendment necessitated the new ground(s) of rejection presented in

this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Loren Chauhan whose telephone number is 571-270-

1554. The examiner can normally be reached on Mon.-Thr. 9:30-5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Lewis Bullock can be reached on 571-272-3759. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lewis A. Bullock, Jr./   /Loren Chauhan/
Supervisory Patent Examiner, Art Unit 2193   Examiner, Art Unit 2193